

Exhibit B
Intelsat License LLC
Hagerstown, Maryland
Viasat 13.5 Meter Earth Station
Site Designator K78

Compliance with FCC Report & Order (FCC 96-377) for the 13.75 - 14.0 GHz Band
Analysis and Calculations

1. Background

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC (“Intelsat”) satellite earth station in Hagerstown, Maryland is in compliance with Federal Communications Commission (“FCC”) Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations (“RADAR”) and the National Aeronautics and Space Administration (“NASA”) space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

Table 1. Earth Station Characteristics

- Coordinates (NAD83): 39° 35’ 53.41” N, 77° 45’ 21.5” W
- Satellite Location for Earth Station: IS-29e 50.0° W
- Frequency Band: 13.75-14.5 GHz for uplink
- Polarizations: Linear
- Emissions: 62M5G7W, 36MG7W, 1MG7W
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 88.6 dBW for all Carriers
- Transmit Antenna Characteristics
 - Antenna Size: 13.5 meter Diameter
 - Antenna Type/Model: 13.5m
 - Gain: 63.3 dBi
- RF power into Antenna Flange: 25.3 dBW (Maximum)
- Minimum Elevation Angle:
Hagerstown, Md. 35.5° @ 139.2° Az.

- Side Lobe Antenna Gain: -6.2 dBi

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both Navy Department and NASA systems. Potential interference from the earth station could impact with Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- 1) Potential Impact to Government Radiolocation (Shipboard Radar)
- 2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

2. Potential Impact to Government Radiolocation (Shipboard Radar)

RADAR may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going U.S. Navy ships. FCC order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (“FSS”) on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/m²/4 kHz.

The closest distance to the shoreline from the Hagerstown earth station is approximately 131km Southeast toward the Atlantic Ocean. The calculation of the power spectral density at this distance is given by:

	<u>1 MHz</u>	<u>36 MHz</u>	<u>62.5 MHz</u>	
1. Clear Sky EIRP:	85.0	85.0	85.0	dBW/4kHz
2. Carrier Bandwidth:	1 MHz	36 MHz	62.5 MHz	MHz
3. PD at antenna input:	-1.68	-17.24	-19.64	dBW/4kHz
4. Transmit Antenna Gain:		62.7		dBi
5. Antenna Gain Horizon:	FCC Reference Pattern			
6. Antenna Elevation Angles:	35.5° -36.6°			

The earth station will radiate interference toward the Chesapeake Bay according to its off-axis side-lobe performance. A conservative analysis, using the FCC standard reference pattern, results in off-axis antenna gains of -6.2 dBi towards the Chesapeake Bay.

Our calculations indicate, in addition to clear path loss, there is an additional path loss of approximately 69.0 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The signal density at the shoreline is:

1 MHz Carriers

PFD = Antenna Feed Power density (dBW/4kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (db-m²) + Additional Losses (dB)

$$\begin{aligned} &= -1.68 \text{ dBW/4kHz} - 6.8 \text{ dBi} - 10*\log[4\pi*(131000\text{m})^2] + \text{Additional Path Losses} \\ &= -144.34 \text{ dBW/ m}^2/4 \text{ kHz} + \text{Additional Path Losses} (\sim 69.0 \text{ dB}) \\ &= -177.32 \text{ dBW/ m}^2/4 \text{ kHz} \end{aligned}$$

36 MHz Carriers

PFD = Antenna Feed Power density (dBW/4kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (db-m²) + Additional Losses (dB)

$$\begin{aligned} &= -17.24 \text{ dBW/4kHz} - 6.8 \text{ dBi} - 10*\log[4\pi*(131000\text{m})^2] + \text{Additional Path Losses} \\ &= -159.90 \text{ dBW/ m}^2/4 \text{ kHz} + \text{Additional Path Losses} (\sim 69.0 \text{ dB}) \\ &= -192.88 \text{ dBW/ m}^2/4 \text{ kHz} \end{aligned}$$

62.5 MHz Carriers

PFD = Antenna Feed Power density (dBW/4kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (db-m²) + Additional Losses (dB)

$$\begin{aligned} &= -19.64 \text{ dBW/4kHz} - 6.8 \text{ dBi} - 10*\log[4\pi*(131000\text{m})^2] + \text{Additional Path Losses} \\ &= -162.30 \text{ dBW/ m}^2/4 \text{ kHz} + \text{Additional Path Losses} (\sim 69.0 \text{ dB}) \\ &= -195.28 \text{ dBW/ m}^2/4 \text{ kHz} \end{aligned}$$

The worst case calculated PFD, including additional path losses, to the closes shoreline location is -177.32 dBW/ m²/4 kHz for the 1 MHz carrier. This is 10.3 dB below the -167 dBW/ m²/4 kHz interference criteria of the R&O 96-377. The 36 MHz and 62.5 MHz carriers each result in even lower levels at the coastline. Therefore, there should be no interference to the US Navy RADAR from the Hagerstown earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA's Tracking and Data Relay Satellite System

The geographic location of the Intelsat License LLC earth station in Hagerstown, Maryland is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the Intelsat License LLC earth station in Hagerstown, Maryland.

The TDRSS space-to-space link in the 13.77 to 13.78 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 13.5 meter earth station will have an EIRP no greater than 71 dBW/6MHz in the 13.77 to 13.78 GHz band. Therefore there should not be interference to the TDRSS space-to-space link and the carriers will

not be allowed in, or to overlap the 13.77 to 13.778 GHz band with aggregate power of, or exceeding 71 dBW/6 MHz.

4. Coordination Issue Result Summary and Conclusions

The results of the analysis and calculations performed in this exhibit indicate that:

- Compatible operation between the earth station at the Hagerstown, Maryland facility and the US Navy Shipboard RADAR systems are achieved with all carrier types.
- The NASA space-to-earth link will not be impacted by any of the emissions.
- The NASA space-to-space link would be impacted by all transmissions, and consequently these transmissions will not be used with an aggregate power of, or exceeding 71 dBW/6 MHz within the 13.77 to 13.78 GHz band.